

## REMARKS

### *Summary of Changes Made*

The application was filed with 14 claims. In previous amendments, claims up to 21 were added and claims 3, and 6-18 were canceled. Presently, new claims 22-24 are added. Accordingly, claims 1, 2, 4, 5 and 19 - 24 (10 claims) remain pending. No new matter is added by this amendment.

### *Claim Rejections - 35 U.S.C. §102(e) or 103(a) - (Chopin)*

Claims 1, 2, 4, 5, and 19-21 are rejected under 35 U.S.C. 102(e) or 103(a) over Chopin, U.S. 6,740,312, ("Chopin"). The Examiner contends that Chopin teaches a method of making titania by hydrolyzing a titanium salt solution by heating in the presence of a reagent including a carboxyl or carbonyl group and further heating with acid. The solution is boiled and may be acidic. The Examiner admits that Chopin fails to explicitly teach the product limitations but concludes that the claimed product is substantially identical to that disclosed and shifts the burden to Applicant to establish that the claimed product is different from that disclosed.

Applicant traverses the rejections. The instantly claimed particles are not the same as disclosed by Chopin. The instantly claimed particles are made in the presence of an aliphatic alcohol, such as glycerol. Chopin's are not. The instantly claimed particles are spherical in shape. Chopin's are not.

The Inventor carried out an experiment as a comparison to the particles used in the method of the instant claims, as detailed in the attached Declaration of Shoichiro Shio, the inventor of the claimed subject matter. The experiment detailed therein is not an embodiment of the presently claimed invention. The method was similar to that disclosed in Chopin, and the reaction conditions were similar to those in Chopin. In detail, titanyl sulfate as a titanium source ( $TiOSO_4$ ) (0.1 mol in 100 mL  $H_2O$  = 1 M concentration) was heated at 90 °C for 3 hours. The pH was adjusted to 7 with NaOH and the resulting precipitate was filtered. No glycerol, or any alcohol was used.

The filtrate thus obtained was water washed several times, and dried for 12 hours at 105°C. A sample of the resulting powder is shown in the Appendix A to the Declaration. It is clear from the photomicrograph that the result of the reaction is a non-spherical agglomerated powder having dimensions in the range of 3 microns, and low surface area.

Further, example 2 of Chopin involves heating to the boiling point (just below 100 °C) for three hours a titanium oxychloride solution including 10g of anatase TiO<sub>2</sub> seeds, the seeds prepared from a titanyl sulfate solution as detailed at column 5, lines 43-54 of Chopin, adjusting the pH to 9 with NaOH, filtering, washing, and drying the particles for four hours at 150 °C. Glycerol is not used. The ultimate starting source of titanium oxide is same in the experiment of the Declaration, in the Comparative Example in the instant specification (pages 17-19) and Chopin's Example 2.

As shown in the Comparative Example (pages 17-19 of the instant specification, Table 1), when the reaction is carried out absent glycerol (i.e., or any alcohol), the result is relatively large primary particles (1-5 microns), with low specific surface area (ca. 100 m<sup>2</sup>/g) having a fan-shape, or non-porous spherical particles with fissures. The lack of glycerol leads to a low surface area.

It is evident that non-spherical agglomerated particles with low surface are the result of hydrolysis without the use of an alcohol such as glycerol, both in the experiment detailed in the Declaration as well as in Chopin. Applicant believes that the processes of Chopin do not lead to spherical titanium oxide particles having the characteristics as claimed in the '461 application.

Chopin achieves a non-agglomerated state only by the addition of the coating, such as silica or alumina. Without such coating, the powders of Chopin are agglomerated.

Based on the foregoing, Applicant asserts that the instant claims are patentable over Chopin.

### ***New Claims***

New claims 22-24 are added herein to round out Applicants' claim coverage. New claim 22 recites the method of claim 1, wherein the primary particles made by subjecting a titanium salt solution to hydrolysis by heating in the presence of glycerol or 1,3-butylene glycol. Claim 23 requires the method of claim 22 to use glycerol, and claim 24 requires the method of claim 22 to use 1,3-butylene glycol. Because no cited prior art discloses or suggests the use of any alcohol, claims 22-24 are patentable.

**CONCLUSION**

Based on the foregoing, the Applicants respectfully request entry of the instant amendment and a Notice of Allowability for claims 1, 2, 4, 5, and 19-24. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application. If there are any additional fees resulting from this communication, please charge the same to our Deposit Account No. 18-0160, our Order No. SHD-18094.

Respectfully submitted,

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